図1

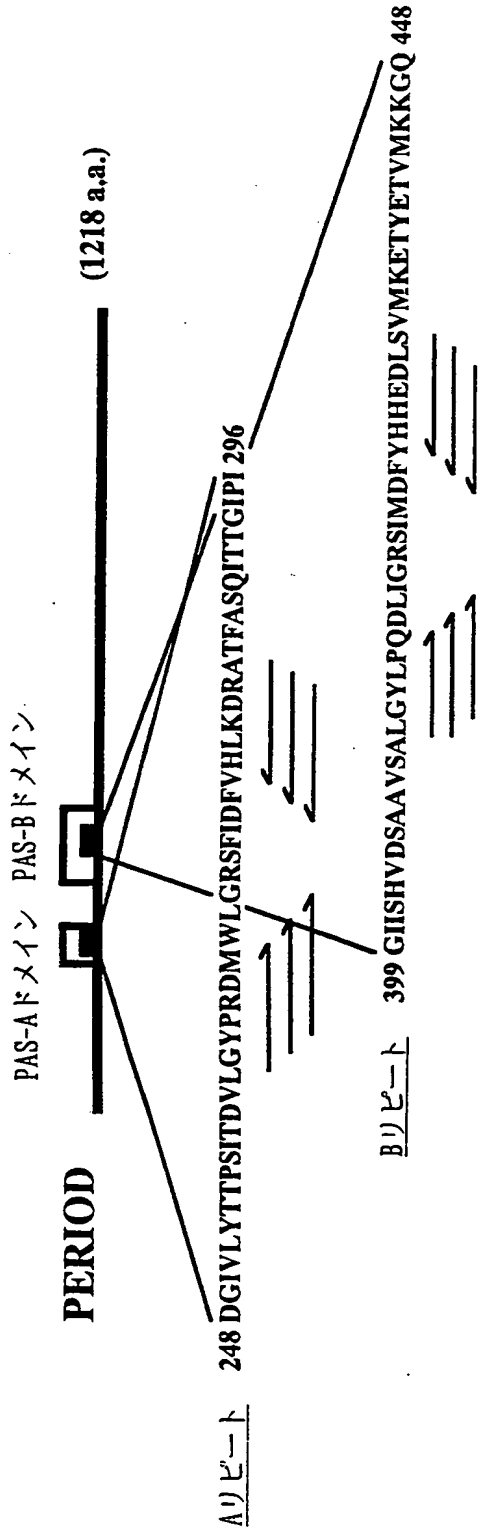

PERIOD
(1218 a.a.)
PAS-Aドメイン
PAS-Bドメイン
Aリピート
248 DGIVLYTTPSITDVLGYPRDMWLGRSFIDFVHLKDRATFASQITTGIPI 296
Bリピート
399 GIISHVDSAAVSALGYLPQDLIGRSIMDFYHHEDLSVMKETYETVMKKGQ 448

図2

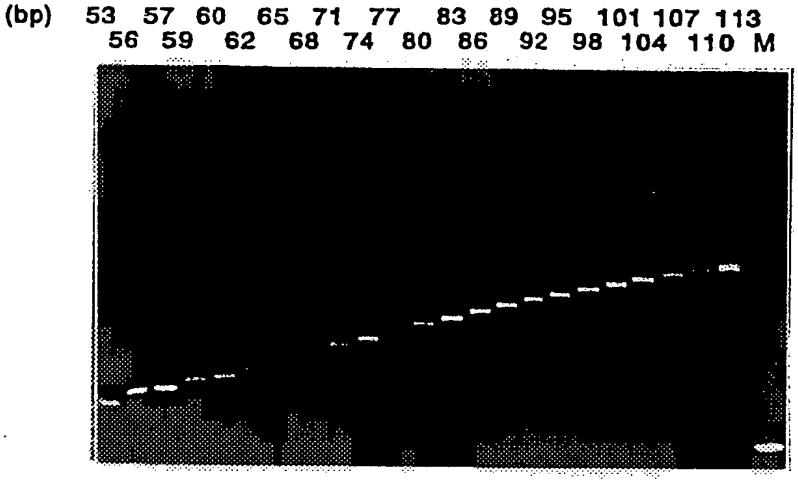

(bp) 53 57 60 65 71 77 83 89 95 101 107 113
56 59 62 68 74 80 86 92 98 104 110 M

図3

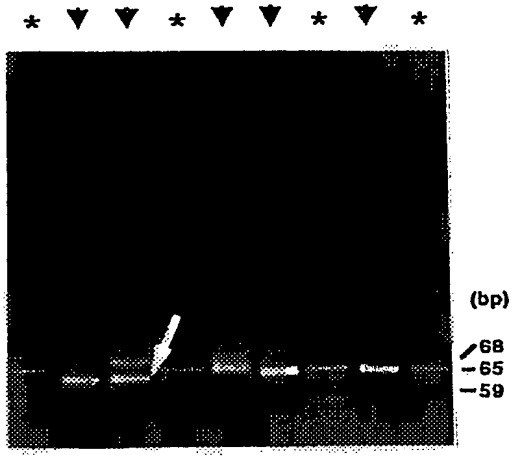


図4

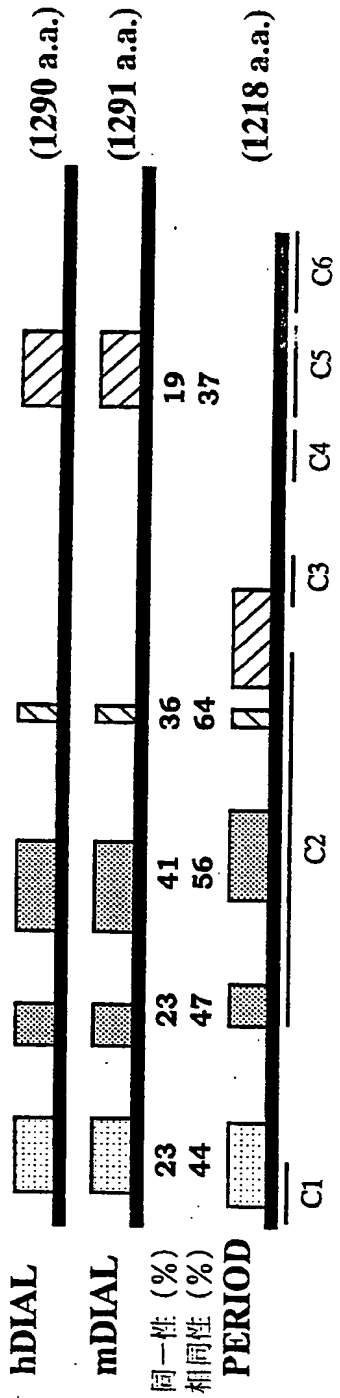

hDIAL
mDIAL
PERIOD
(1290 a.a.)
(1291 a.a.)
(1218 a.a.)
同一性（%）
相同性（%）
23
44
23
47
41
56
36
64
19
37
C1
C2
C3
C4
C5
C6

図5

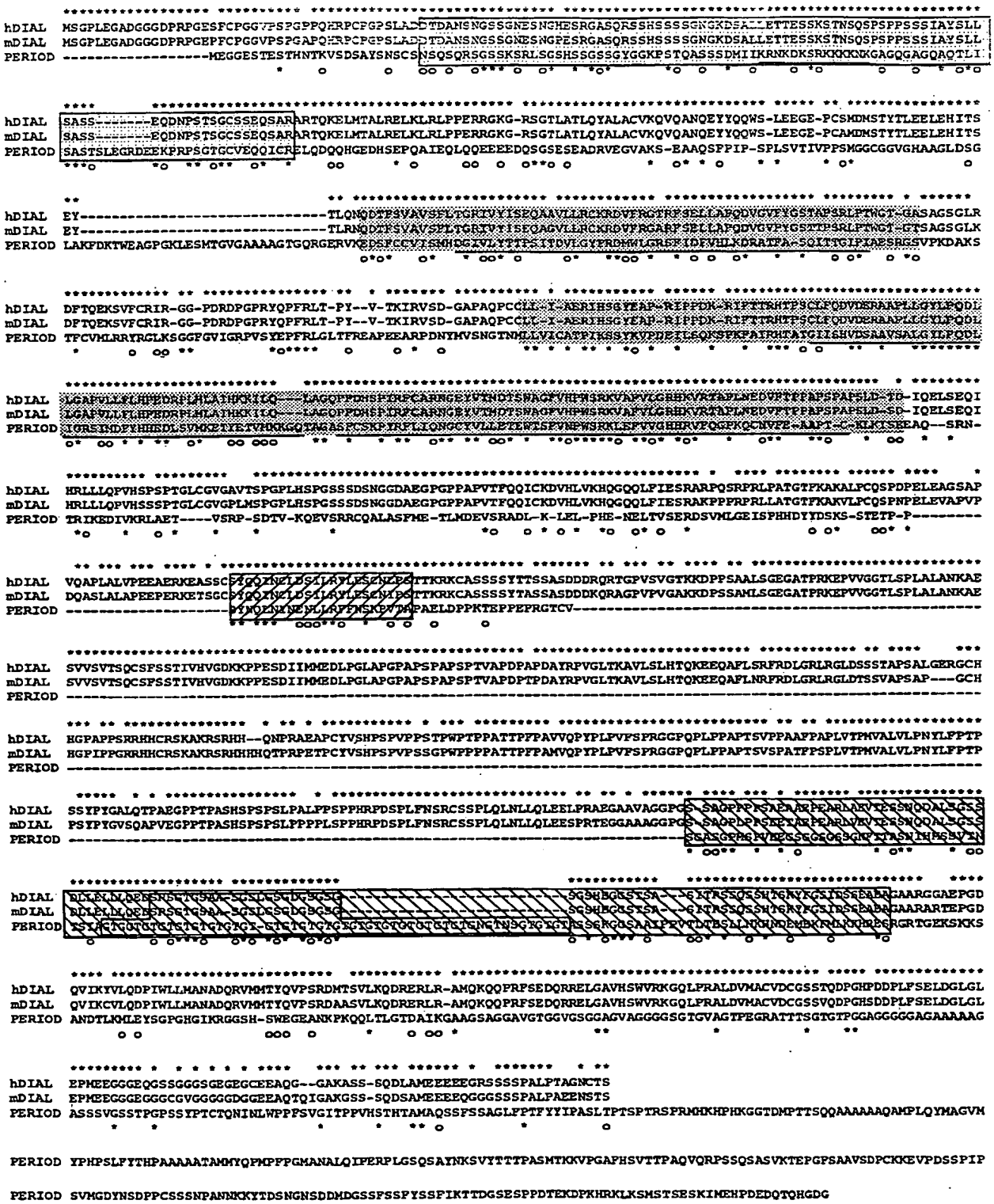


図6

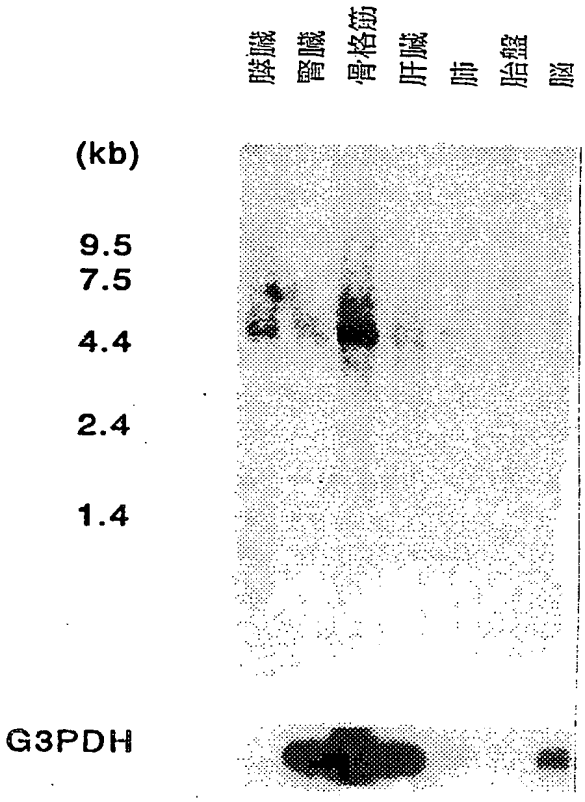


図7

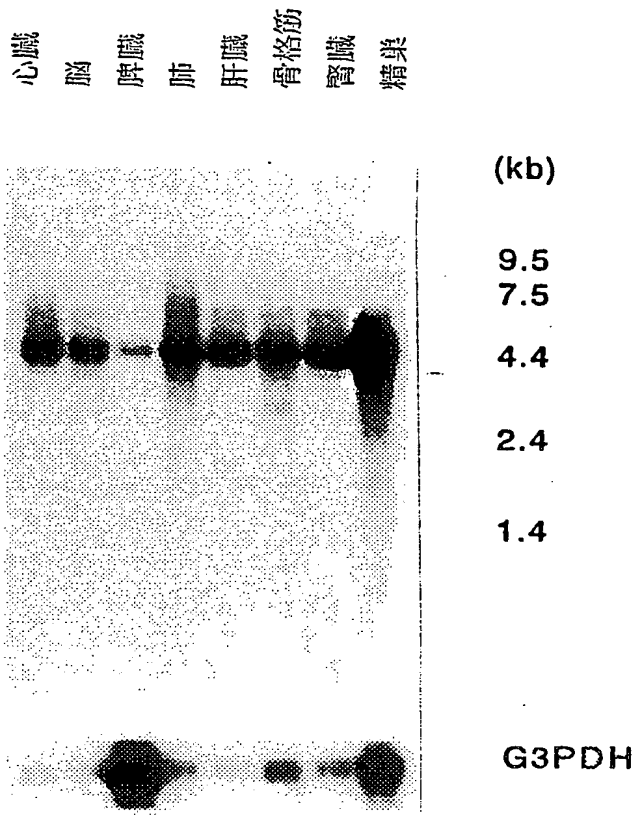


図8

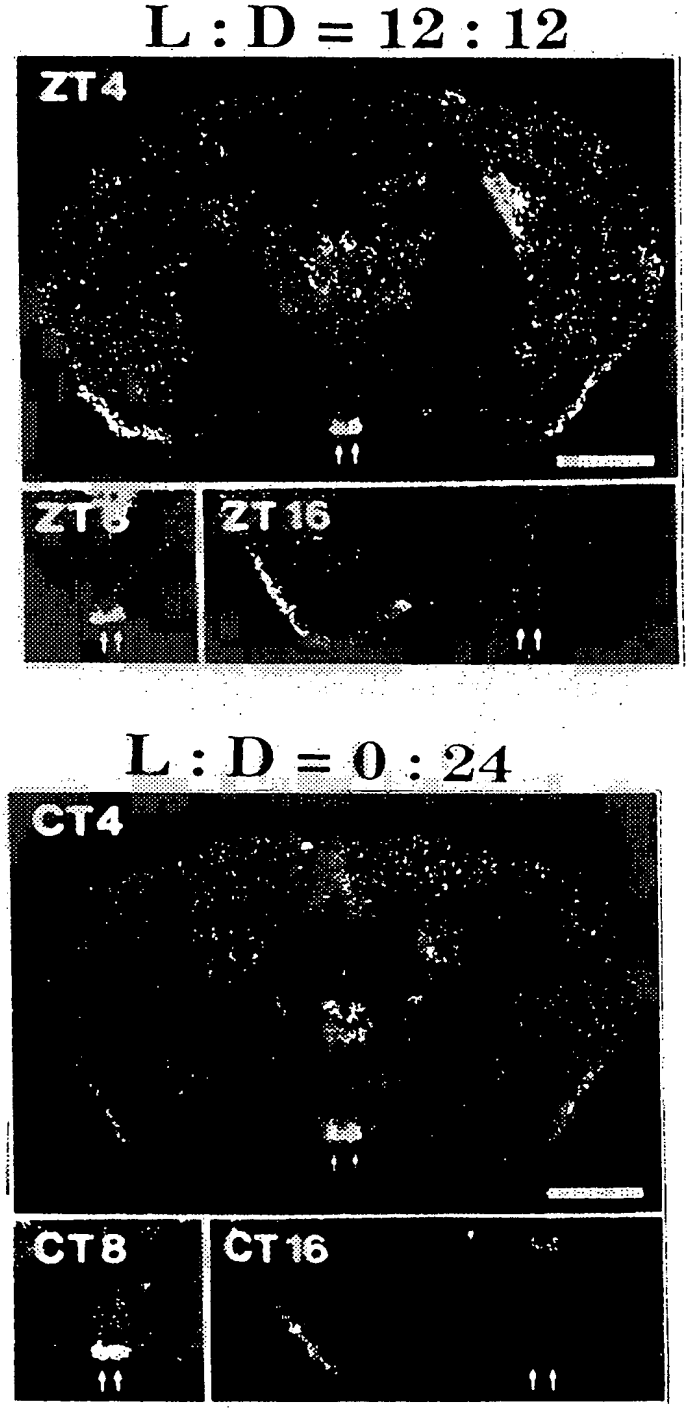


図9

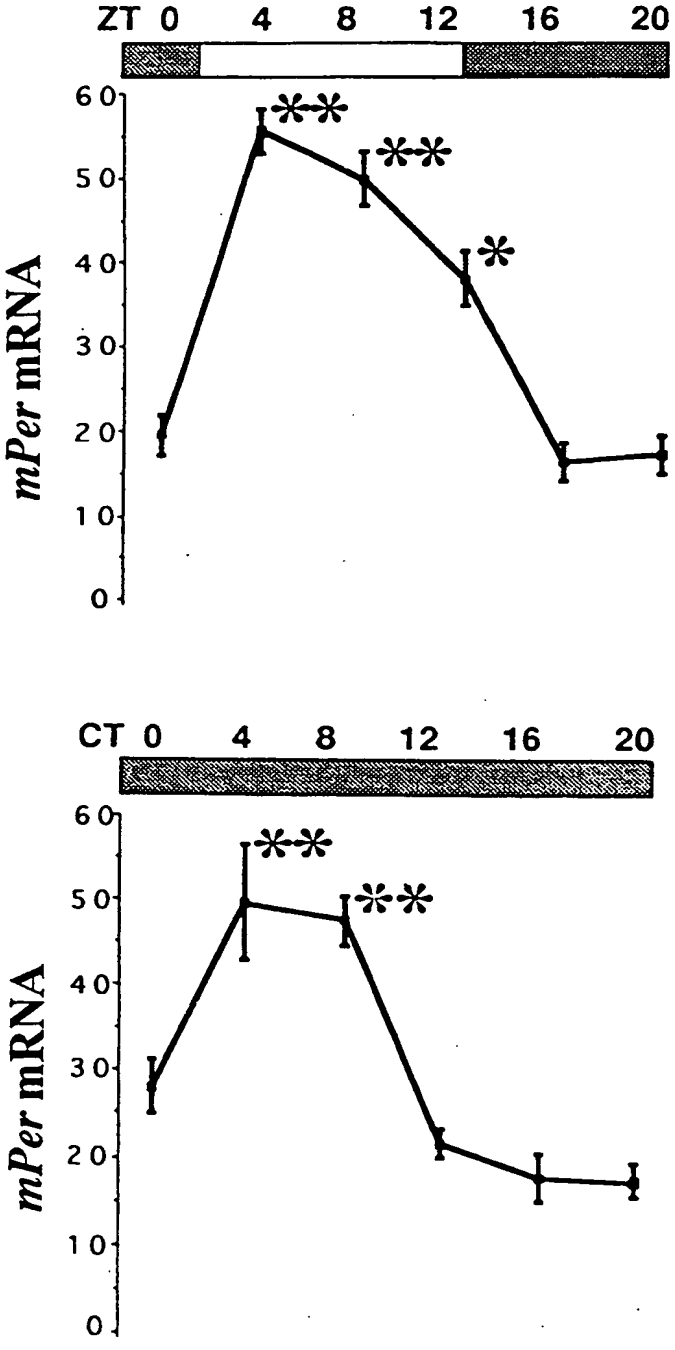
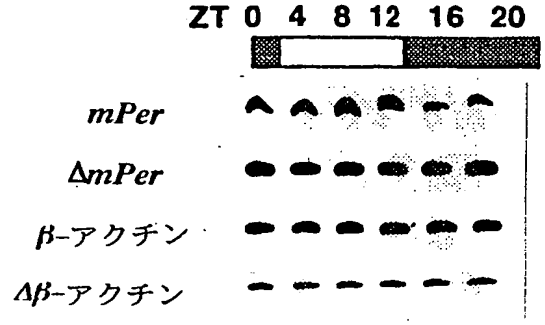
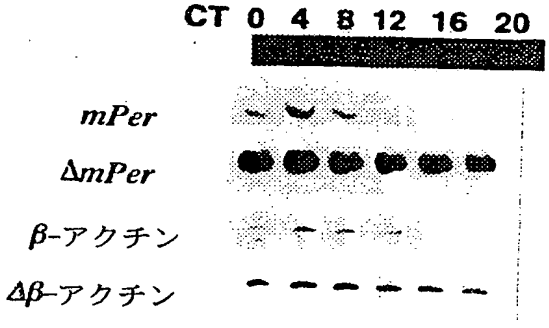

ZT 0
4
8
12
16
20
60
50
40
30
20
10
0
mPer mRNA
**
**
*
CT 0
4
8
12
16
20
60
50
40
30
20
10
0
mPer mRNA
**
**

図10


ZT 0 4 8 12 16 20
mPer
ΔmPer
β-アクチン
Δβ-アクチン


CT 0 4 8 12 16 20
mPer
ΔmPer
β-アクチン
Δβ-アクチン

配列表

SEQUENCE LISTING

<110> SAKAKI, Yoshiyuki

榊　佳之

<120> Mammalian Genes Involving in Circadian Oscillation

サーカディアン周期に関与する哺乳動物遺伝子

<130> SEN-903PCT

<150> JP 9-267846

<151> 1997-09-12

<160> 4

<210> 1

<211> 1290

<212> PRT

<213> Homo sapiens

<400> 1

Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro

1 5 10 15

Gly Glu Ser Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Pro Pro Gln
20 25 30

His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
35 40 45

Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly His Glu Ser Arg Gly
50 55 60

Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65 70 75 80

Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
85 90 95

Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
100 105 110

Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
115 120 125

Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
130 135 140

Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145 150 155 160

Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
165 170 175

Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
180 185 190

Cys Ser Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
195 200 205

Thr Ser Glu Tyr Thr Leu Gln Asn Gln Asp Thr Phe Ser Val Ala Val
210 215 220

Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Ala Val
225 230 235 240

Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Thr Arg Phe Ser Glu
245 250 255

Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Ala Pro
260 265 270

Ser Arg Leu Pro Thr Trp Gly Thr Gly Ala Ser Ala Gly Ser Gly Leu
275 280 285

Arg Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly

290 295 300

Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305 310 315 320

Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
325 330 335

Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
340 345 350

Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
355 360 365

Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
370 375 380

Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385 390 395 400

Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
405 410 415

Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
420 425 430

Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
435 440 445

Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
450 455 460

Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465 470 475 480

Ser Leu Asp Thr Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
485 490 495

Leu Leu Gln Pro Val His Ser Pro Ser Pro Thr Gly Leu Cys Gly Val
500 505 510

Gly Ala Val Thr Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
515 520 525

Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
530 535 540

Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545 550 555 560

Gln Gln Leu Phe Ile Glu Ser Arg Ala Arg Pro Gln Ser Arg Pro Arg
565 570 575

Leu Pro Ala Thr Gly Thr Phe Lys Ala Lys Ala Leu Pro Cys Gln Ser
580 585 590

Pro Asp Pro Glu Leu Glu Ala Gly Ser Ala Pro Val Gln Ala Pro Leu
595 600 605

Ala Leu Val Pro Glu Glu Ala Glu Arg Lys Glu Ala Ser Ser Cys Ser
610 615 620

Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625 630 635 640

Cys Asn Leu Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
645 650 655

Tyr Thr Thr Ser Ser Ala Ser Asp Asp Asp Arg Gln Arg Thr Gly Pro
660 665 670

Val Ser Val Gly Thr Lys Lys Asp Pro Pro Ser Ala Ala Leu Ser Gly
675 680 685

Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
690 695 700

Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser

705 710 715 720

Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
725 730 735

Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
740 745 750

Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
755 760 765

Ala Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
770 775 780

Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Ser Arg Phe Arg Asp
785 790 795 800

Leu Gly Arg Leu Arg Gly Leu Asp Ser Ser Ser Thr Ala Pro Ser Ala
805 810 815

Leu Gly Glu Arg Gly Cys His His Gly Pro Ala Pro Pro Ser Arg Arg
820 825 830

His His Cys Arg Ser Lys Ala Lys Arg Ser Arg His His Gln Asn Pro
835 840 845

Arg Ala Glu Ala Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Pro
850 855 860

Ser Thr Pro Trp Pro Thr Pro Pro Ala Thr Thr Pro Phe Pro Ala Val
865 870 875 880

Val Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln
885 890 895

Pro Leu Pro Pro Ala Pro Thr Ser Val Pro Pro Ala Ala Phe Pro Ala
900 905 910

Pro Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe
915 920 925

Pro Thr Pro Ser Ser Tyr Pro Tyr Gly Ala Leu Gln Thr Pro Ala Glu
930 935 940

Gly Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Ala
945 950 955 960

Leu Pro Pro Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser
965 970 975

Arg Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Leu
980 985 990

Pro Arg Ala Glu Gly Ala Ala Val Ala Gly Gly Pro Gly Ser Ser Ala
995 1000 1005

Gly Pro Pro Pro Pro Ser Ala Glu Ala Ala Glu Pro Glu Ala Arg Leu
1010 1015 1020

Ala Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser
1025 1030 1035 1040

Asp Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly
1045 1050 1055

Ser Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly
1060 1065 1070

Ser Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser
1075 1080 1085

Ser Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser
1090 1095 1100

Glu Ala Glu Ala Gly Ala Ala Arg Gly Gly Ala Glu Pro Gly Asp Gln
1105 1110 1115 1120

Val Ile Lys Tyr Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn

1125 1130 1135

Ala Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Met
1140 1145 1150

Thr Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys
1155 1160 1165

Gln Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val
1170 1175 1180

His Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met
1185 1190 1195 1200

Ala Cys Val Asp Cys Gly Ser Ser Thr Gln Asp Pro Gly His Pro Asp
1205 1210 1215

Asp Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu
1220 1225 1230

Glu Gly Gly Gly Glu Gln Gly Ser Ser Gly Gly Gly Ser Gly Glu Gly
1235 1240 1245

Glu Gly Cys Glu Glu Ala Gln Gly Gly Ala Lys Ala Ser Ser Ser Gln
1250 1255 1260

Asp Leu Ala Met Glu Glu Glu Glu Glu Gly Arg Ser Ser Ser Ser Pro
1265 1270 1275 1280

Ala Leu Pro Thr Ala Gly Asn Cys Thr Ser
1285 1290

<210> 2
<211> 1291
<212> PRT
<213> Mus musculus

<400> 2
Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1 5 10 15

Gly Glu Pro Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Ala Pro Gln
20 25 30

His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
35 40 45

Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly Pro Glu Ser Arg Gly
50 55 60

Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65 70 75 80

Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
85 90 95

Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
100 105 110

Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
115 120 125

Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
130 135 140

Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145 150 155 160

Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
165 170 175

Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
180 185 190

Cys Ala Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
195 200 205

Thr Ser Glu Tyr Thr Leu Arg Asn Gln Asp Thr Phe Ser Val Ala Val

210 215 220

Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Gly Val
225 230 235 240

Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Ala Arg Phe Ser Glu
245 250 255

Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Thr Pro
260 265 270

Ser Arg Leu Pro Thr Trp Gly Thr Gly Thr Ser Ala Gly Ser Gly Leu
275 280 285

Lys Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
290 295 300

Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305 310 315 320

Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
325 330 335

Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
340 345 350

Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
355 360 365

Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
370 375 380

Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385 390 395 400

Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
405 410 415

Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
420 425 430

Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
435 440 445

Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
450 455 460

Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465 470 475 480

Ser Leu Asp Ser Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
485 490 495

Leu Leu Gln Pro Val His Ser Ser Ser Pro Thr Gly Leu Cys Gly Val
500 505 510

Gly Pro Leu Met Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
515 520 525

Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
530 535 540

Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545 550 555 560

Gln Gln Leu Phe Ile Glu Ser Arg Ala Lys Pro Pro Pro Arg Pro Arg
565 570 575

Leu Leu Ala Thr Gly Thr Phe Lys Ala Lys Val Leu Pro Cys Gln Ser
580 585 590

Pro Asn Pro Glu Leu Glu Val Ala Pro Val Pro Asp Gln Ala Ser Leu
595 600 605

Ala Leu Ala Pro Glu Glu Pro Glu Arg Lys Glu Thr Ser Gly Cys Ser
610 615 620

Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser

625 630 635 640

Cys Asn Ile Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
645 650 655

Tyr Thr Ala Ser Ser Ala Ser Asp Asp Asp Lys Gln Arg Ala Gly Pro
660 665 670

Val Pro Val Gly Ala Lys Lys Asp Pro Ser Ser Ala Met Leu Ser Gly
675 680 685

Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
690 695 700

Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705 710 715 720

Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
725 730 735

Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
740 745 750

Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
755 760 765

Thr Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
770 775 780

Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Asn Arg Phe Arg Asp
785 790 795 800

Leu Gly Arg Leu Arg Gly Leu Asp Thr Ser Ser Val Ala Pro Ser Ala
805 810 815

Pro Gly Cys His His Gly Pro Ile Pro Pro Gly Arg Arg His His Cys
820 825 830

Arg Ser Lys Ala Lys Arg Ser Arg His His His His Gln Thr Pro Arg
835 840 845

Pro Glu Thr Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Ser Ser
850 855 860

Gly Pro Trp Pro Pro Pro Pro Ala Thr Thr Pro Phe Pro Ala Met Val
865 870 875 880

Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln Pro
885 890 895

Leu Pro Pro Ala Pro Thr Ser Val Ser Pro Ala Thr Phe Pro Ser Pro
900 905 910

Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe Pro
915 920 925

Thr Pro Pro Ser Tyr Pro Tyr Gly Val Ser Gln Ala Pro Val Glu Gly
930 935 940

Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Pro Pro
945 950 955 960

Pro Leu Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser Arg
965 970 975

Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Ser Pro
980 985 990

Arg Thr Glu Gly Gly Ala Ala Ala Gly Gly Pro Gly Ser Ser Ala Gly
995 1000 1005

Pro Leu Pro Pro Ser Glu Glu Thr Ala Glu Pro Glu Ala Arg Leu Val
1010 1015 1020

Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser Asp
1025 1030 1035 1040

Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly Ser

1045 1050 1055

Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly Ser
1060 1065 1070

Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser Ser
1075 1080 1085

Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser Glu
1090 1095 1100

Ala Glu Ala Gly Ala Ala Arg Ala Arg Thr Glu Pro Gly Asp Gln Val
1105 1110 1115 1120

Ile Lys Cys Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn Ala
1125 1130 1135

Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Ala Ala
1140 1145 1150

Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys Gln
1155 1160 1165

Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val His
1170 1175 1180

Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met Ala
1185 1190 1195 1200

Cys Val Asp Cys Gly Ser Ser Val Gln Asp Pro Gly His Ser Asp Asp
1205 1210 1215

Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu Glu
1220 1225 1230

Gly Gly Gly Glu Gly Gly Gly Cys Gly Val Gly Gly Gly Gly Gly Asp
1235 1240 1245

Gly Gly Glu Glu Ala Gln Thr Gln Ile Gly Ala Lys Gly Ser Ser Ser
1250 1255 1260

Gln Asp Ser Ala Met Glu Glu Glu Glu Gln Gly Gly Gly Ser Ser Ser
1265 1270 1275 1280

Pro Ala Leu Pro Ala Glu Glu Asn Ser Thr Ser
1285 1290

<210> 3

<211> 3873

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (1)..(3873)

<400> 3

atg agt ggc ccc cta gaa ggg gct gat ggg gga ggg gac ccc agg cct 48
Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1 5 10 15

ggg gaa tca ttt tgt cct ggg ggc gtc cca tcc cct ggg ccc cca cag 96
Gly Glu Ser Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Pro Pro Gln
20 25 30

cac cgg cct tgc cca ggc ccc agc ctg gcc gat gac acc gat gcc aac 144
His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
35 40 45

agc aat ggt tca agt ggc aat gag tcc aac ggg cat gag tct aga ggc 192
Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly His Glu Ser Arg Gly
50 55 60

gca tct cag cgg agc tca cac agc tcc tcc tca ggc aac ggc aag gac 240
Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65 70 75 80

tca gcc ctg ctg gag acc act gag agc agc aag agc aca aac tct cag 288

Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
85 90 95

agc cca tcc cca ccc agc agt tcc att gcc tac agc ctc ctg agt gcc 336
Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
100 105 110

agc tca gag cag gac aac ccg tcc acc agt ggc tgc agc agt gaa cag 384
Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
115 120 125

tca gcc cgg gca agg act cag aag gaa ctc atg aca gca ctt cga gag 432
Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
130 135 140

ctc aag ctt cga ctg ccg cca gag cgc cgg ggc aag ggc cgc tct ggg 480
Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145 150 155 160

acc ctg gcc acg ctg cag tac gca ctg gcc tgt gtc aag cag gtg cag 528
Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
165 170 175

gcc aac cag gaa tac tac cag cag tgg agc ctg gag gag ggc gag cct 576
Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
180 185 190

```
tgc tcc atg gac atg tcc acc tat acc ctg gag gag ctg gag cac atc      624
Cys Ser Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
        195                 200                 205

acg tct gag tac aca ctt cag aac cag gat acc ttc tca gtg gct gtc      672
Thr Ser Glu Tyr Thr Leu Gln Asn Gln Asp Thr Phe Ser Val Ala Val
    210                 215                 220

tcc ttc ctg acg ggc cga atc gtc tac att tcg gag cag gca gcc gtc      720
Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Ala Val
225                 230                 235                 240

ctg ctg cgt tgc aag cgg gac gtg ttc cgg ggt acc cgc ttc tct gag      768
Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Thr Arg Phe Ser Glu
                245                 250                 255

ctc ctg gct ccc cag gat gtg gga gtc ttc tat ggt tcc act gct cca      816
Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Ala Pro
            260                 265                 270

tct cgc ctg ccc acc tgg ggc aca ggg gcc tca gca ggt tca ggc ctc      864
Ser Arg Leu Pro Thr Trp Gly Thr Gly Ala Ser Ala Gly Ser Gly Leu
        275                 280                 285

agg gac ttt acc cag gag aag tcc gtc ttc tgc cgt atc aga gga ggt      912
```

Arg Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
290 295 300

cct gac cgg gat cca ggg cct cgg tac cag cca ttc cgc cta acc ccg 960
Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305 310 315 320

tat gtg acc aag atc cgg gtc tca gat ggg gcc cct gca cag ccg tgc 1008
Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
325 330 335

tgc ctg ctg att gca gag cgc atc cat tcg ggt tac gaa gct ccc cgg 1056
Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
340 345 350

ata ccc cct gac aag agg att ttc act acg cgg cac aca ccc agc tgc 1104
Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
355 360 365

ctc ttc cag gat gtg gat gaa agg gct gcc ccc ctg ctg ggc tac ctg 1152
Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
370 375 380

ccc cag gac ctc ctg ggg gcc cca gtg ctc ctg ttc ctg cat cct gag 1200
Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385 390 395 400

gac cga ccc ctc atg ctg gct atc cac aag aag att ctg cag ttg gcg 1248
Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
405 410 415

ggc cag ccc ttt gac cac tcc cct atc cgc ttc tgt gcc cgc aac ggg 1296
Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
420 425 430

gag tat gtc acc atg gac acc agc tgg gct ggc ttt gtg cac ccc tgg 1344
Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
435 440 445

agc cgc aag gta gcc ttc gtg ttg ggc cgc cac aaa gta cgc acg gcc 1392
Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
450 455 460

ccc ctg aat gag gac gtg ttc act ccc ccg gcc ccc agc cca gct ccc 1440
Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465 470 475 480

tcc ctg gac act gat atc cag gag ctg tca gag cag atc cac cgg ctg 1488
Ser Leu Asp Thr Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
485 490 495

ctg ctg cag ccc gtc cac agc ccc agc ccc acg gga ctc tgt gga gtc 1536

Leu Leu Gln Pro Val His Ser Pro Ser Pro Thr Gly Leu Cys Gly Val
500 505 510

ggc gcc gtg aca tcc cca ggc cct ctc cac agc cct ggg tcc tcc agt 1584
Gly Ala Val Thr Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
515 520 525

gat agc aac ggg ggt gat gca gag ggg cct ggg cct cct gcg cca gtg 1632
Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
530 535 540

act ttc cag cag atc tgt aag gat gtg cat ctg gtg aag cac cag ggc 1680
Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545 550 555 560

cag cag ctt ttt att gag tct cgg gcc cgg cct cag tcc cgg ccc cgc 1728
Gln Gln Leu Phe Ile Glu Ser Arg Ala Arg Pro Gln Ser Arg Pro Arg
565 570 575

ctc cct gct aca ggc acg ttc aag gcc aag gcc ctt ccc tgc caa tcc 1776
Leu Pro Ala Thr Gly Thr Phe Lys Ala Lys Ala Leu Pro Cys Gln Ser
580 585 590

cca gac cca gag ctg gag gcg ggt tct gct ccc gtc cag gcc cca cta 1824
Pro Asp Pro Glu Leu Glu Ala Gly Ser Ala Pro Val Gln Ala Pro Leu
595 600 605

gcc ttg gtc cct gag gag gcc gag agg aaa gaa gcc tcc agc tgc tcc 1872
Ala Leu Val Pro Glu Glu Ala Glu Arg Lys Glu Ala Ser Ser Cys Ser
610 615 620

tac cag cag atc aac tgc ctg gac agc atc ctc agg tac ctg gag agc 1920
Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625 630 635 640

tgc aac ctc ccc agc acc act aag cgt aaa tgt gcc tcc tcc tcc tcc 1968
Cys Asn Leu Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
645 650 655

tat acc acc tcc tca gcc tct gac gac gac agg cag agg aca ggt cca 2016
Tyr Thr Thr Ser Ser Ala Ser Asp Asp Asp Arg Gln Arg Thr Gly Pro
660 665 670

gtc tct gtg ggg acc aag aaa gat ccg ccg tca gca gcg ctg tct ggg 2064
Val Ser Val Gly Thr Lys Lys Asp Pro Pro Ser Ala Ala Leu Ser Gly
675 680 685

gag ggg gcc acc cca cgg aag gag cca gtg gtg gga ggc acc ctg agc 2112
Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
690 695 700

ccg ctc gcc ctg gcc aat aag gcg gag agt gtg gtg tcc gtc acc agt 2160

Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705 710 715 720

cag tgt agc ttc agc tcc acc atc gtc cat gtg gga gac aag aag ccc 2208
Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
725 730 735

ccg gag tcg gac atc atc atg atg gag gac ctg cct ggc cta gcc cca 2256
Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
740 745 750

ggc cca gcc ccc agc cca gcc ccc agc ccc aca gta gcc cct gac cca 2304
Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
755 760 765

gcc cca gac gcc tac cgt cca gtg ggg ctg acc aag gcc gtg ctg tcc 2352
Ala Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
770 775 780

ctg cac aca cag aag gaa gag caa gcc ttc ctc agc cgc ttc cga gac 2400
Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Ser Arg Phe Arg Asp
785 790 795 800

ctg ggc agg ctg cgt gga ctc gac agc tct tcc aca gct ccc tca gcc 2448
Leu Gly Arg Leu Arg Gly Leu Asp Ser Ser Ser Thr Ala Pro Ser Ala
805 810 815

ctt ggc gag cga ggc tgc cac cac ggc ccc gca ccc cca agc cgc cga 2496
Leu Gly Glu Arg Gly Cys His His Gly Pro Ala Pro Pro Ser Arg Arg
820 825 830

cac cac tgc cga tcc aaa gcc aag cgc tca cgc cac cac cag aac cct 2544
His His Cys Arg Ser Lys Ala Lys Arg Ser Arg His His Gln Asn Pro
835 840 845

cgg gct gaa gcg ccc tgc tat gtc tca cac ccc tca ccc gtg cca ccc 2592
Arg Ala Glu Ala Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Pro
850 855 860

tcc acc ccc tgg ccc acc cca cca gcc act acc ccc ttc cca gcg gtt 2640
Ser Thr Pro Trp Pro Thr Pro Pro Ala Thr Thr Pro Phe Pro Ala Val
865 870 875 880

gtc cag ccc tac cct ctc cca gtg ttc tct cct cga gga ggc ccc cag 2688
Val Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln
885 890 895

cct ctt ccc cct gct ccc aca tct gtg ccc cca gct gct ttc ccc gcc 2736
Pro Leu Pro Pro Ala Pro Thr Ser Val Pro Pro Ala Ala Phe Pro Ala
900 905 910

cct ttg gtg acc cca atg gtg gcc ttg gtg ctc cct aac tat ctg ttc 2784

Pro Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe
915 920 925

cca acc cca tcc agc tat cct tat ggg gca ctc cag acc cct gct gaa 2832
Pro Thr Pro Ser Ser Tyr Pro Tyr Gly Ala Leu Gln Thr Pro Ala Glu
930 935 940

ggg cct ccc act cct gcc tcg cac tcc cct tct cca tcc ttg ccc gcc 2880
Gly Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Ala
945 950 955 960

ctc ccc ccg agt cct cct cac cgc ccg gac tct cca ctg ttc aac tcg 2928
Leu Pro Pro Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser
965 970 975

aga tgc agc tct cca ctc cag ctc aat ctg ctg cag ctg gag gag ctc 2976
Arg Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Leu
980 985 990

ccc cgt gct gag ggg gct gct gtt gca gga ggc cct ggg agc agt gcc 3024
Pro Arg Ala Glu Gly Ala Ala Val Ala Gly Gly Pro Gly Ser Ser Ala
995 1000 1005

ggg ccc cca cct ccc agt gcg gag gct gct gag cca gag gcc aga ctg 3072
Gly Pro Pro Pro Pro Ser Ala Glu Ala Ala Glu Pro Glu Ala Arg Leu
1010 1015 1020

gcg gag gtc act gag tcc tcc aat cag gac gca ctt tcc ggc tcc agt 3120
Ala Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser
1025 1030 1035 1040

gac ctg ctc gaa ctt ctg ctg caa gag gac tcg cgc tcc ggc aca ggc 3168
Asp Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly
1045 1050 1055

tcc gca gcc tcg ggc tcc ttg ggc tct ggc ttg ggc tct ggg tct ggt 3216
Ser Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly
1060 1065 1070

tca ggc tcc cat gaa ggg ggc agc acc tca gcc agc atc act cgc agc 3264
Ser Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser
1075 1080 1085

agc cag agc agc cac aca agc aaa tac ttt ggc agc atc gac tct tcc 3312
Ser Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser
1090 1095 1100

gag gct gag gct ggg gct gct cgg ggc ggg gct gag cct ggg gac cag 3360
Glu Ala Glu Ala Gly Ala Ala Arg Gly Gly Ala Glu Pro Gly Asp Gln
1105 1110 1115 1120

gtg att aag tac gtg ctc cag gat ccc att tgg ctg ctc atg gcc aat 3408

Val Ile Lys Tyr Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn
1125 1130 1135

gct gac cag cgc gtc atg atg acc tac cag gtg ccc tcc agg gac atg 3456
Ala Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Met
1140 1145 1150

acc tct gtg ctg aag cag gat cgg gag cgg ctc cga gcc atg cag aag 3504
Thr Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys
1155 1160 1165

cag cag cct cgg ttt tct gag gac cag cgg cgg gaa ctg ggt gct gtg 3552
Gln Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val
1170 1175 1180

cac tcc tgg gtc cgg aag ggc caa ctg cct cgg gct ctt gat gtg atg 3600
His Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met
1185 1190 1195 1200

gcc tgt gtg gac tgt ggg agc agc acc caa gat cct ggt cac cct gat 3648
Ala Cys Val Asp Cys Gly Ser Ser Thr Gln Asp Pro Gly His Pro Asp
1205 1210 1215

gac cca ctc ttc tca gag ctg gat gga ctg ggg ctg gag ccc atg gaa 3696
Asp Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu
1220 1225 1230

gag ggt gga ggc gag cag ggc agc agc ggt ggc ggc agt ggt gag gga 3744
Glu Gly Gly Gly Glu Gln Gly Ser Ser Gly Gly Gly Ser Gly Glu Gly
1235 1240 1245

gag ggc tgc gag gag gcc caa ggc ggg gcc aag gct tca agc tct cag 3792
Glu Gly Cys Glu Glu Ala Gln Gly Gly Ala Lys Ala Ser Ser Ser Gln
1250 1255 1260

gac ttg gct atg gag gag gag gaa gaa ggc agg agc tca tcc agt cca 3840
Asp Leu Ala Met Glu Glu Glu Glu Glu Gly Arg Ser Ser Ser Ser Pro
1265 1270 1275 1280

gcc tta cct aca gca gga aac tgc acc agc tag 3873
Ala Leu Pro Thr Ala Gly Asn Cys Thr Ser
1285 1290

<210> 4
<211> 3876
<212> DNA
<213> Mus musculus

<220>
<221> CDS
<222> (1)..(3876)

<400> 4

atg agt ggt ccc cta gaa ggg gcc gat ggg gga gga gac ccc agg ccc 48
Met Ser Gly Pro Leu Glu Gly Ala Asp Gly Gly Gly Asp Pro Arg Pro
1 5 10 15

gga gaa cct ttt tgt cct gga gga gtc cca tcc cct ggg gcc ccg cag 96
Gly Glu Pro Phe Cys Pro Gly Gly Val Pro Ser Pro Gly Ala Pro Gln
20 25 30

cac cgg cct tgt cca ggc ccc agc ctg gct gat gac act gat gca aac 144
His Arg Pro Cys Pro Gly Pro Ser Leu Ala Asp Asp Thr Asp Ala Asn
35 40 45

agc aat ggc tca agt ggc aat gag tcc aac gga ccc gag tcc agg ggc 192
Ser Asn Gly Ser Ser Gly Asn Glu Ser Asn Gly Pro Glu Ser Arg Gly
50 55 60

gca tct cag cgg agt tct cat agt tcc tct tct ggc aat ggc aag gac 240
Ala Ser Gln Arg Ser Ser His Ser Ser Ser Ser Gly Asn Gly Lys Asp
65 70 75 80

tca gct ctg ctg gag acc act gag agc agc aag agt aca aac tca cag 288
Ser Ala Leu Leu Glu Thr Thr Glu Ser Ser Lys Ser Thr Asn Ser Gln
85 90 95

agc cca tcc cca ccc agc agc tcc att gcc tac agc ctc ctg agt gcg 336

Ser Pro Ser Pro Pro Ser Ser Ser Ile Ala Tyr Ser Leu Leu Ser Ala
100 105 110

agc tca gag cag gac aac cca tct acc agt ggc tgc agc agt gaa cag 384
Ser Ser Glu Gln Asp Asn Pro Ser Thr Ser Gly Cys Ser Ser Glu Gln
115 120 125

tca gct cga gcc agg acc cag aaa gaa ctc atg act gca ctt cgg gag 432
Ser Ala Arg Ala Arg Thr Gln Lys Glu Leu Met Thr Ala Leu Arg Glu
130 135 140

ctc aaa ctt cga ctg cca cca gag cgt cgg ggc aag ggc cgc tct ggg 480
Leu Lys Leu Arg Leu Pro Pro Glu Arg Arg Gly Lys Gly Arg Ser Gly
145 150 155 160

acc ttg gcc aca ctg cag tac gct ctg gcc tgt gtc aag cag gtt cag 528
Thr Leu Ala Thr Leu Gln Tyr Ala Leu Ala Cys Val Lys Gln Val Gln
165 170 175

gct aac cag gaa tat tac cag cag tgg agt ctg gag gag ggt gag cct 576
Ala Asn Gln Glu Tyr Tyr Gln Gln Trp Ser Leu Glu Glu Gly Glu Pro
180 185 190

tgt gcc atg gac atg tct act tac acc ctg gag gaa ttg gag cat atc 624
Cys Ala Met Asp Met Ser Thr Tyr Thr Leu Glu Glu Leu Glu His Ile
195 200 205

aca tcc gaa tac aca ctt cga aac cag gac acc ttc tct gtg gct gtg 672
Thr Ser Glu Tyr Thr Leu Arg Asn Gln Asp Thr Phe Ser Val Ala Val
210 215 220

tcc ttc ctg aca ggc cgg att gtc tat att tcg gag cag gca ggt gtc 720
Ser Phe Leu Thr Gly Arg Ile Val Tyr Ile Ser Glu Gln Ala Gly Val
225 230 235 240

ctg ctg cgt tgc aaa cgg gat gtg ttt cgg ggt gcc cgc ttc tca gag 768
Leu Leu Arg Cys Lys Arg Asp Val Phe Arg Gly Ala Arg Phe Ser Glu
245 250 255

ctc ctg gct ccc cag gat gtg ggt gtc ttc tat ggc tct act aca cca 816
Leu Leu Ala Pro Gln Asp Val Gly Val Phe Tyr Gly Ser Thr Thr Pro
260 265 270

tct cga ctg ccc acc tgg ggc act ggc acc tct gca ggt tca ggt ctc 864
Ser Arg Leu Pro Thr Trp Gly Thr Gly Thr Ser Ala Gly Ser Gly Leu
275 280 285

aag gac ttc acc cag gaa aag tct gtc ttc tgc cga atc aga gga ggt 912
Lys Asp Phe Thr Gln Glu Lys Ser Val Phe Cys Arg Ile Arg Gly Gly
290 295 300

cct gac cgg gat cca ggg cct cgg tac cag cca ttc cgc cta acc cca 960

Pro Asp Arg Asp Pro Gly Pro Arg Tyr Gln Pro Phe Arg Leu Thr Pro
305 310 315 320

tat gtg acc aag att cgg gtc tca gat gga gcc cct gca cag ccg tgc 1008
Tyr Val Thr Lys Ile Arg Val Ser Asp Gly Ala Pro Ala Gln Pro Cys
325 330 335

tgc cta ctc att gcc gag cgc atc cac tct ggt tat gaa gct ccc cgg 1056
Cys Leu Leu Ile Ala Glu Arg Ile His Ser Gly Tyr Glu Ala Pro Arg
340 345 350

atc cct cct gac aag agg atc ttc acc acc cga cac aca cca agc tgc 1104
Ile Pro Pro Asp Lys Arg Ile Phe Thr Thr Arg His Thr Pro Ser Cys
355 360 365

ctc ttc cag gat gta gat gaa agg gct gcc cca ctg ctg ggt tac ctt 1152
Leu Phe Gln Asp Val Asp Glu Arg Ala Ala Pro Leu Leu Gly Tyr Leu
370 375 380

ccc cag gat ctc ctg ggg gct cca gta ctt ctc ttt cta cat cct gag 1200
Pro Gln Asp Leu Leu Gly Ala Pro Val Leu Leu Phe Leu His Pro Glu
385 390 395 400

gac cga ccc ctc atg ctg gcc att cat aag aag ata ctg cag ctg gca 1248
Asp Arg Pro Leu Met Leu Ala Ile His Lys Lys Ile Leu Gln Leu Ala
405 410 415

ggc cag ccc ttt gac cat tcc cct att cgc ttc tgt gct cgg aac ggg 1296
Gly Gln Pro Phe Asp His Ser Pro Ile Arg Phe Cys Ala Arg Asn Gly
420 425 430

gaa tat gtc acc atg gac acc agc tgg gcc ggt ttt gtg cac ccc tgg 1344
Glu Tyr Val Thr Met Asp Thr Ser Trp Ala Gly Phe Val His Pro Trp
435 440 445

agc cgc aag gtg gct ttc gtg ttg ggt cgc cat aaa gtg cgc acg gca 1392
Ser Arg Lys Val Ala Phe Val Leu Gly Arg His Lys Val Arg Thr Ala
450 455 460

ccc ctg aat gag gac gtc ttc act ccc cca gcc ccc agc cca gct ccg 1440
Pro Leu Asn Glu Asp Val Phe Thr Pro Pro Ala Pro Ser Pro Ala Pro
465 470 475 480

tcc ctg gac tct gat atc cag gag ctc tca gag cag atc cat cga ttg 1488
Ser Leu Asp Ser Asp Ile Gln Glu Leu Ser Glu Gln Ile His Arg Leu
485 490 495

ctg ctg cag cct gtg cac agc tcc agc ccc acg ggg ctc tgt gga gtt 1536
Leu Leu Gln Pro Val His Ser Ser Ser Pro Thr Gly Leu Cys Gly Val
500 505 510

ggc cct ctg atg tcc cct ggt cct cta cac agc cct ggc tcc tcc agt 1584

Gly Pro Leu Met Ser Pro Gly Pro Leu His Ser Pro Gly Ser Ser Ser
515 520 525

gat agc aat ggg ggg gac gct gag ggg cct ggg cct cct gct cca gtg 1632
Asp Ser Asn Gly Gly Asp Ala Glu Gly Pro Gly Pro Pro Ala Pro Val
530 535 540

act ttc cag cag atc tgt aag gat gtg cat ctg gta aag cac cag gga 1680
Thr Phe Gln Gln Ile Cys Lys Asp Val His Leu Val Lys His Gln Gly
545 550 555 560

caa cag ctc ttc att gaa tct cgg gcc aag ccc cca ccc cgg ccc cgc 1728
Gln Gln Leu Phe Ile Glu Ser Arg Ala Lys Pro Pro Pro Arg Pro Arg
565 570 575

ctc ctt gct aca ggt aca ttc aaa gcc aaa gtc ctt ccc tgc cag tcc 1776
Leu Leu Ala Thr Gly Thr Phe Lys Ala Lys Val Leu Pro Cys Gln Ser
580 585 590

cca aac ccc gaa ctg gag gtg gcc cca gtt cct gac caa gcc tcg tta 1824
Pro Asn Pro Glu Leu Glu Val Ala Pro Val Pro Asp Gln Ala Ser Leu
595 600 605

gcc ttg gcc cct gag gag cca gag agg aaa gaa acc tct ggc tgt tcc 1872
Ala Leu Ala Pro Glu Glu Pro Glu Arg Lys Glu Thr Ser Gly Cys Ser
610 615 620

tac cag cag atc aac tgc ctg gac agc atc ctc agg tat ttg gag agc 1920
Tyr Gln Gln Ile Asn Cys Leu Asp Ser Ile Leu Arg Tyr Leu Glu Ser
625 630 635 640

tgc aac att ccc agt aca acc aag cgt aaa tgt gcc tcc tcc tcc tcc 1968
Cys Asn Ile Pro Ser Thr Thr Lys Arg Lys Cys Ala Ser Ser Ser Ser
645 650 655

tac act gcc tct tca gcc tct gat gat gac aag cag agg gca ggt cca 2016
Tyr Thr Ala Ser Ser Ala Ser Asp Asp Asp Lys Gln Arg Ala Gly Pro
660 665 670

gtt cct gtg ggg gcc aag aaa gat ccg tcg tca gca atg ctg tct ggg 2064
Val Pro Val Gly Ala Lys Lys Asp Pro Ser Ser Ala Met Leu Ser Gly
675 680 685

gag ggg gca act cct cgg aag gag cca gtg gtg gga ggc acc ctg agc 2112
Glu Gly Ala Thr Pro Arg Lys Glu Pro Val Val Gly Gly Thr Leu Ser
690 695 700

ccg ctc gcc ctg gcc aat aag gca gag agc gtg gtg tcc gtc acc agt 2160
Pro Leu Ala Leu Ala Asn Lys Ala Glu Ser Val Val Ser Val Thr Ser
705 710 715 720

cag tgt agc ttc agc tcc acc atc gtc cat gtg gga gac aag aag ccc 2208

Gln Cys Ser Phe Ser Ser Thr Ile Val His Val Gly Asp Lys Lys Pro
725 730 735

ccg gag tcg gac atc atc atg atg gaa gac ctg cct ggc ctg gcc cct 2256
Pro Glu Ser Asp Ile Ile Met Met Glu Asp Leu Pro Gly Leu Ala Pro
740 745 750

ggc cca gcc ccc agt ccg gcc ccc agc ccc aca gta gcc cct gac cca 2304
Gly Pro Ala Pro Ser Pro Ala Pro Ser Pro Thr Val Ala Pro Asp Pro
755 760 765

acc cca gat gct tat cgc cca gtg ggt ctg acc aag gcc gtg ctg tcc 2352
Thr Pro Asp Ala Tyr Arg Pro Val Gly Leu Thr Lys Ala Val Leu Ser
770 775 780

ctg cac aca cag aag gaa gag caa gcc ttc ctc aac cgc ttc aga gat 2400
Leu His Thr Gln Lys Glu Glu Gln Ala Phe Leu Asn Arg Phe Arg Asp
785 790 795 800

ctt ggc agg ctt cgt gga ctt gac acc tct tct gtg gcc ccc tca gcc 2448
Leu Gly Arg Leu Arg Gly Leu Asp Thr Ser Ser Val Ala Pro Ser Ala
805 810 815

cct ggc tgc cac cat ggc ccc att ccc cct ggt cgc cga cac cac tgc 2496
Pro Gly Cys His His Gly Pro Ile Pro Pro Gly Arg Arg His His Cys
820 825 830

cga tct aaa gca aag cgt tcc cgc cac cac cac cac cag acc ccc cgg 2544
Arg Ser Lys Ala Lys Arg Ser Arg His His His His Gln Thr Pro Arg
835 840 845

ccc gaa act ccc tgc tat gtc tcc cat cct tca cct gtg ccc tct tct 2592
Pro Glu Thr Pro Cys Tyr Val Ser His Pro Ser Pro Val Pro Ser Ser
850 855 860

gga ccc tgg cca ccc cca cca gcc acg acc ccc ttc cca gca atg gtc 2640
Gly Pro Trp Pro Pro Pro Pro Ala Thr Thr Pro Phe Pro Ala Met Val
865 870 875 880

cag ccc tac cca ctc cca gta ttc tcc cct cga gga gga ccc cag ccc 2688
Gln Pro Tyr Pro Leu Pro Val Phe Ser Pro Arg Gly Gly Pro Gln Pro
885 890 895

ctt ccc cct gcc cct aca tct gtg tcc cct gct acc ttc cct tct ccc 2736
Leu Pro Pro Ala Pro Thr Ser Val Ser Pro Ala Thr Phe Pro Ser Pro
900 905 910

tta gtg acc cca atg gtg gcc ttg gtg ctc cct aac tat cta ttc cct 2784
Leu Val Thr Pro Met Val Ala Leu Val Leu Pro Asn Tyr Leu Phe Pro
915 920 925

acc cca cct agt tat cca tat ggg gtg tcc cag gcc cct gtt gag ggg 2832

Thr Pro Pro Ser Tyr Pro Tyr Gly Val Ser Gln Ala Pro Val Glu Gly
930 935 940

cca ccc acg cct gct tcc cac tcg ccc tct cca tcc ctg ccc cca cca 2880
Pro Pro Thr Pro Ala Ser His Ser Pro Ser Pro Ser Leu Pro Pro Pro
945 950 955 960

cct ctc agc ccc ccc cac cgc cca gac tcc cca ctg ttc aac tcg aga 2928
Pro Leu Ser Pro Pro His Arg Pro Asp Ser Pro Leu Phe Asn Ser Arg
965 970 975

tgc agc tcc cca ctc cag ctc aat ctg ctg cag ctt gag gag tcc ccc 2976
Cys Ser Ser Pro Leu Gln Leu Asn Leu Leu Gln Leu Glu Glu Ser Pro
980 985 990

cgc acg gag ggg ggc gct gct gca gga ggc cca gga agc agt gct ggg 3024
Arg Thr Glu Gly Gly Ala Ala Ala Gly Gly Pro Gly Ser Ser Ala Gly
995 1000 1005

ccc ctg cct ccc agt gag gag act gct gag cca gag gcc aga ttg gtg 3072
Pro Leu Pro Pro Ser Glu Glu Thr Ala Glu Pro Glu Ala Arg Leu Val
1010 1015 1020

gag gtt act gag tcg tcc aat cag gat gca ctt tca ggc tcc agc gac 3120
Glu Val Thr Glu Ser Ser Asn Gln Asp Ala Leu Ser Gly Ser Ser Asp
1025 1030 1035 1040

ctg ctg gag cta ctg ctc caa gaa gac tct cgc tcg ggc aca ggc tcc 3168
Leu Leu Glu Leu Leu Leu Gln Glu Asp Ser Arg Ser Gly Thr Gly Ser
1045 1050 1055

gca gcc tca ggc tcc ctg ggc tct ggc ctg ggc tct ggg tct ggt tca 3216
Ala Ala Ser Gly Ser Leu Gly Ser Gly Leu Gly Ser Gly Ser Gly Ser
1060 1065 1070

gga tcc cac gaa ggg gga agc acc tca gcc agc atc acc cgc agc agt 3264
Gly Ser His Glu Gly Gly Ser Thr Ser Ala Ser Ile Thr Arg Ser Ser
1075 1080 1085

cag agc agc cat aca agc aag tac ttt ggc agc atc gac tct tcc gag 3312
Gln Ser Ser His Thr Ser Lys Tyr Phe Gly Ser Ile Asp Ser Ser Glu
1090 1095 1100

gct gaa gct ggg gct gct cgg gcc agg act gag cct ggg gac cag gtc 3360
Ala Glu Ala Gly Ala Ala Arg Ala Arg Thr Glu Pro Gly Asp Gln Val
1105 1110 1115 1120

att aag tgt gtg ctc cag gac ccc atc tgg ctg ctc atg gcc aat gcc 3408
Ile Lys Cys Val Leu Gln Asp Pro Ile Trp Leu Leu Met Ala Asn Ala
1125 1130 1135

gac cag cgt gtc atg atg aca tac cag gtg ccg tcc agg gat gca gcc 3456

Asp Gln Arg Val Met Met Thr Tyr Gln Val Pro Ser Arg Asp Ala Ala
1140 1145 1150

tct gtg ctg aag caa gac cgg gag agg ctc cgg gcc atg cag aaa cag 3504
Ser Val Leu Lys Gln Asp Arg Glu Arg Leu Arg Ala Met Gln Lys Gln
1155 1160 1165

cag cca cgg ttc tca gag gac cag agg cgg gaa ctg ggt gct gtg cac 3552
Gln Pro Arg Phe Ser Glu Asp Gln Arg Arg Glu Leu Gly Ala Val His
1170 1175 1180

tcc tgg gtc cgg aag ggc cag ctg cct cgg gcc ctt gat gtg atg gcg 3600
Ser Trp Val Arg Lys Gly Gln Leu Pro Arg Ala Leu Asp Val Met Ala
1185 1190 1195 1200

tgt gtg gac tgt ggc agc agc gtt caa gat cct ggc cac tct gat gac 3648
Cys Val Asp Cys Gly Ser Ser Val Gln Asp Pro Gly His Ser Asp Asp
1205 1210 1215

ccg ctc ttc tca gaa ctg gat gga ttg ggg ctg gag ccc atg gaa gag 3696
Pro Leu Phe Ser Glu Leu Asp Gly Leu Gly Leu Glu Pro Met Glu Glu
1220 1225 1230

ggt gga ggc gag ggt ggt ggg tgt ggt gtt ggc ggc ggt ggg ggt gat 3744
Gly Gly Gly Glu Gly Gly Gly Cys Gly Val Gly Gly Gly Gly Gly Asp
1235 1240 1245

ggt ggt gag gag gcc cag acc caa att ggg gct aag ggt tca agc tct 3792
Gly Gly Glu Glu Ala Gln Thr Gln Ile Gly Ala Lys Gly Ser Ser Ser
1250 1255 1260

cag gac tct gcc atg gag gaa gaa gag caa ggt ggg ggc tca tcc agc 3840
Gln Asp Ser Ala Met Glu Glu Glu Glu Gln Gly Gly Gly Ser Ser Ser
1265 1270 1275 1280

cca gct tta cct gca gaa gaa aac agc acc agc tag 3876
Pro Ala Leu Pro Ala Glu Glu Asn Ser Thr Ser
1285 1290